

PROTECTION OF FRUIT TREES FROM
RODENTS

OHIO
Agricultural Experiment
Station

WOOSTER, OHIO, U. S. A., AUGUST, 1909.

BULLETIN 208



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BULLETIN

OF THE

Ohio Agricultural Experiment Station

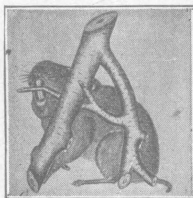
NUMBER 208

AUGUST, 1909

PROTECTION OF FRUIT TREES FROM RODENTS

By F. H. BALLOU

PREFACE



ACCORDING to the Official Report of the Ohio Department of Agriculture for 1907, there are, in the state, 266,340 acres of tree fruits including all classes. Of those classes more subject to tree injury by rodents, viz., apple, pear and plum, there are 247,700 acres. Of apples alone there are 243,716 acres. This great acreage includes not

only the extensive commercial plantations, but the thousands of small, home orchards, scattered in every part of the state.

There are no data available which would render possible anywhere near a correct estimate of the loss of and injury to trees, young and old, through the work of rodents (mice, rabbits and woodchucks) in Ohio. While the loss is confined principally to newly set orchards, replants in older orchards and the younger plantations generally, this loss, in the aggregate, is considerable. It certainly would not be far beyond the bounds of conservatism to figure the loss and injury at one dollar per acre per year including all ages and conditions of the apple, pear and plum orchards of the state. The rate of loss would be less than this in the larger commercial plantations, even where the grass-mulch method of culture is practiced; for the commercial planter generally takes into consideration the various sources of danger and makes provision to

meet these with effective means of protection. With the average home orchard the danger is greater than in the large plantation, and the possible means of protection more generally disregarded or over-looked.

Thus do we find, by a very simple calculation, that there is probably incurred, annually, the astounding loss of over \$200,000 in Ohio, from the work of the sharp teeth of bark-eating rodents, and those of mischievous and destructive habits.

Much complaint has been received by the Horticultural Department of the Experiment Station, of the injury and loss wrought by rodents, and repeated requests for suggestions as to effective means of protection of young and newly set orchards have been received. In many cases bearing trees are reported killed by mice.

In order to fully meet the demands of the planting public, this illustrated pamphlet has been prepared, which is the first of a series of purely practical bulletins planned to be issued in the future by the Horticultural Department of the Station. This series of bulletins will present in popular form that class of information so eagerly and persistently sought by the hundreds of beginners in horticulture who write to the Station for suggestions and assistance.

I. A TRUE ORCHARD INCIDENT

Accompanied by a little daughter who is deeply interested in and delights in trees, plants and flowers and the furred and feathered families which make their homes among them, the writer visited a certain section of our young apple orchard growing under the grass-mulch method of culture on a steep hill-slope at "Dale View." It was in the late summer of 1908, the season at which the owners of young trees should plan for protection from rabbits, which often begin testing the sharpness of their teeth as early as November, while there is yet an abundance of green vegetation upon which to feed.

The first tree visited was one which had been top-grafted in the spring of 1908 with a rare, new variety. While admiring the growth of this young tree the loss of which would be a very serious matter indeed, the observing eyes of the little girl detected a bit of rabbit fur clinging to the grass stems nearby. Here was a recognized clue to something of interest to a youthful lover of nature. A short search followed and its object was discovered.

"Baby rabbits—come and see!" Parting the bluegrass and white clover she exposed four little, frightened balls of fur shrinking down in the small, grass-lined excavation in the ground.



Fig. 1. "Baby rabbits—Come and see!"

Here, indeed, was an orchard problem! Within five feet of the base of the almost priceless tree and surrounded by other young trees of value, was a quartette of youthful representatives of a formidable orchard pest. "To kill or not to kill" might naturally become the question in the mind of the orchardist under these circumstances. Should the enemy be diminished by four at a single stroke, or *should the tree be protected and the enemy spared?* The question in this instance was submitted to American girlhood for decision.

The verdict was rendered without debate. *The tree was protected—so was the enemy!* The one to continue growth unblemished with promise of fruitful days to come; the others to rapidly outgrow their period of innocence and harmlessness and develop into agile, rollicking, mischief-working rodents which inspire no further real appreciation until “bagged” by a careful gunner; then, at last, they “promise to be good”—served on the table of the orchardist.



Fig. 2. Should we slay the enemy or protect the tree?

II. FURTHER DISCOVERIES

Let us resume our visit of inspection in this young orchard. Here is a row of trees six or seven years of age which has, in a measure, outgrown the period of danger of injury by rabbits. Dare we allow ourselves to feel secure in considering these beyond the need of further attention. By no means! They had been heavily mulched with grass cut from between the rows in June; but up through this mulch are pushing, here and there, sturdy growths of rag-weed, yarrow, sorrel and other strong-growing weeds which, together with the decaying material of the mulch beneath, provide excellent hiding places and covers under which the field or meadow mice will work when winter comes, if not before.

Let us draw back the mulch from about the stems of a few of the trees and see what may be found. Many “runs” and burrows of field mice are thus exposed, but the trees, so far, seem to be

untouched; for it should be remembered that proper precautions had been taken each autumn previous to protect these same trees from winter injury by mice. We are just about to congratulate ourselves that our young orchard is unblemished when we examine a much-prized tree of the Benoni apple and find it almost completely girdled. There are even *fresh* marks of mischievous, little teeth, impressing us with the truth that we should not consider our mulched trees safe from these little rodents even in the summer season.



Fig. 3. The tree was protected—so was the enemy!

Resuming our way through a younger portion of the orchard we come upon a little tree whose stem is scarred by deep, jagged wounds where the powerful jaws and vicious, cutting teeth of some rodent have been exercised. The bark has not been eaten as by rabbits or mice—only terribly mutilated. The destructive work is at once recognized as that of a trespassing woodchuck or “ground-hog” whose freshly made burrow is found nearby.

Farther up on the hillside other mounds of fresh earth clearly show that a colony of these troublesome rodents is establishing itself and forcing upon us many destructive and unwelcome guests.

With the patience and cunning that in time become characteristic of the devoted photographer, we succeed in catching, with the camera, a very-much-alive "chuck" indulging in a day-dream in the

entrance to his burrow. (See frontispiece).

Later this same burrow shall have dropped into its deep passage a small ball of rags or twine saturated with bisulphide of carbon, after which the entrance must be closed securely with a banking of soil firmly tamped or pounded. The deadly penetrating vapor or gas from this dangerous, explosive chemical, will fill the burrow and the inmates will lapse into a sleep during which there will be no dreams of mischief for the future.



Fig. 4. They promise to be good.

III. OBJECT LESSONS IN TREE PROTECTION

As an object lesson in tree protection, a row of young trees in this young orchard was fitted with the various types of mechanical protectors now known and used by various horticulturists. These are shown by photographs on the following pages and are accompanied by brief descriptions and remarks which will readily enable the planter to decide which form or means of protection will best suit his conditions.

BANKING WITH SOIL OR CINDERS

The soil or cinder mound as a protection against tree injury by field mice is first described, not only because it is quite effective in itself, but because it is recommended in conjunction with various other mechanical protectors designed to prevent injury by the larger rodents.

Mice rarely injure trees except where grass, strawy manure, boards or trash of some kind about the base of the tree provide a hiding place; they will not come out into the open to work, but choose to perform their depredations under cover.

In mounding fruit trees for protection from mice there are three important points to observe:

First, clear away the grass, trash or mulch from the base of the tree for a foot or more in all directions.

Second, with the foot, or, better with a "post tamper," thoroughly firm the surface of the soil about the base of the tree. This breaks down and fills any runs or burrows that may be just below the surface.

Third, with a few shovelfuls of fresh soil or cinders form a small mound (twelve or fourteen inches in diameter at the base and from 4 to 6 inches high) about the stem of the tree, firming the soil well.

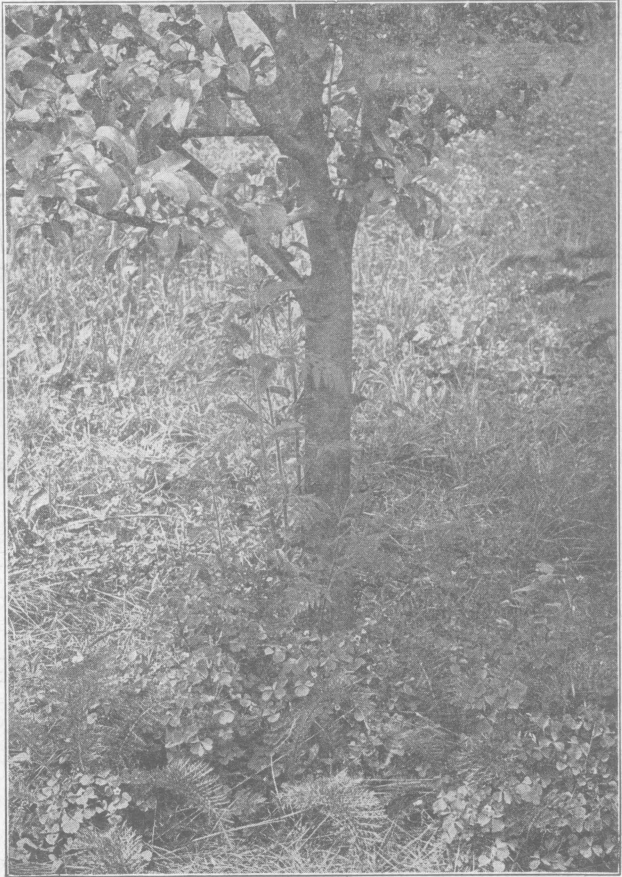


Fig. 5. Where danger lurks.

The tops of these small mounds are usually kept quite bare by the sweeping force of the winter winds, even if there be several inches of snow on the ground. Mice will not venture out on these exposures to feed on the bark of the trees; and burrowing into the freshly packed soil is not likely to be attempted in the winter, even in open weather.



Fig. 6. Vicious work of woodchucks.

For apple trees the 24 inch width is usually the more convenient size. This is cut crosswise with tinner's snips or shears into 12-inch sections, making pieces 12 x 24 inches in size. These sections are

The mounds may be left throughout the year, but they should be tamped hard and repaired by the addition of fresh soil each autumn.

Where cinders are available these are a most excellent and inexpensive material with which to mound the stems of all kinds of fruit trees. Mice will not burrow through the cinders as they do through soil.

THE WIRE SCREEN

This is the ideal and complete, all-round protector and it is, therefore, given first place among the mechanical forms. True, it is more expensive than many others, but it is lasting and thoroughly effective against all kinds of rodents which prey upon the stems of young trees. Being so light and open, it presents the least obstruction to strong winds; the air and sunshine are freely admitted; no dark and secure places of concealment, such as invite woolly-aphis and other forms of insect life are afforded.

This protector is made of galvanized wire cloth of one-quarter inch mesh (four 22 gauge wires to the

carefully bent or rolled over a small, round piece of wood (a section of broom or fork handle will answer) shaping them into cylinders $2\frac{1}{2}$ to three inches in diameter. It is well to allow the edges to lap about one inch.

The cylinders are placed about the stem of the trees where their own tension will close them securely.

At the present quoted price of \$3.00 per roll of 100

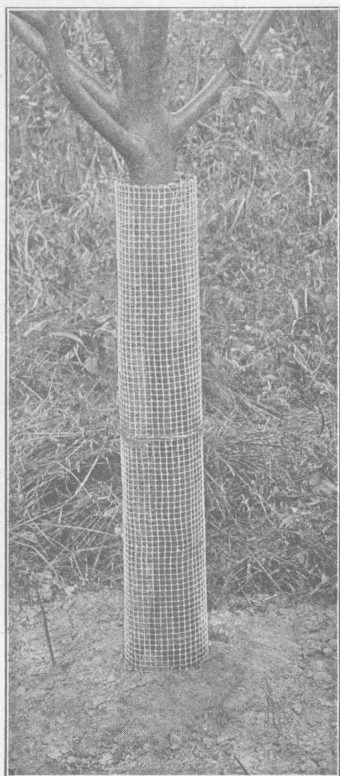


Fig. 8. The wire screen.

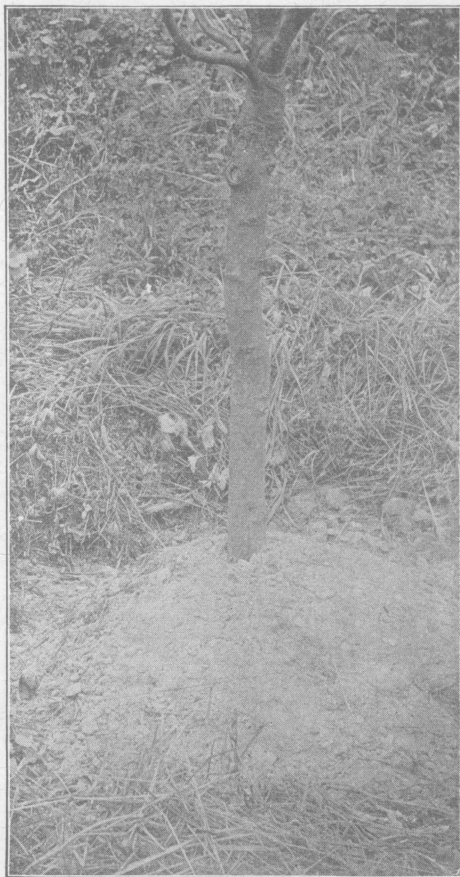


Fig. 7. The soil mound.

lineal feet for 24 inch wire cloth, protectors of the dimensions given will cost \$3.00 per hundred aside from the work of cutting and shaping them, which anyone handy with tools can readily do.

SMALL MESHED POULTRY NETTING

This protector is made of ordinary weight, galvanized wire poultry netting of one inch mesh. This is quite as effective against rabbits as the closer-woven wire cloth, but will not protect the trees

from mice. This netting may be purchased in bales of 150 lineal feet and cut and shaped just as described for the wire cloth. The present price of the 24 inch wire is \$3.30 per bale. This style of protector would, therefore, cost \$2.20 per hundred. These are very neat and sightly and do admirably for cultivated orchards, or wherever the method of culture or the environment does not favor the presence of field

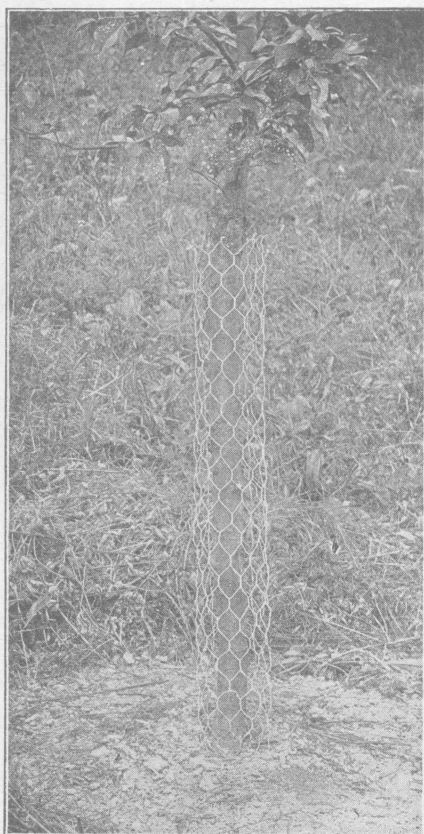


Fig. 9. Small meshed poultry netting.

mice. In combination with a slight mound of soil about the base of the tree, mice will rarely prove troublesome.

STANDARD POULTRY NETTING

It often happens that the planter of a few trees has at hand a quantity of old poultry netting of standard or 2-inch mesh. From this stock in hand quite serviceable protectors can be made by cutting out sections 18 x 24 inches in size and rolling them around a section of broom handle as described. The mesh being so large, the pieces are cut six inches wider than

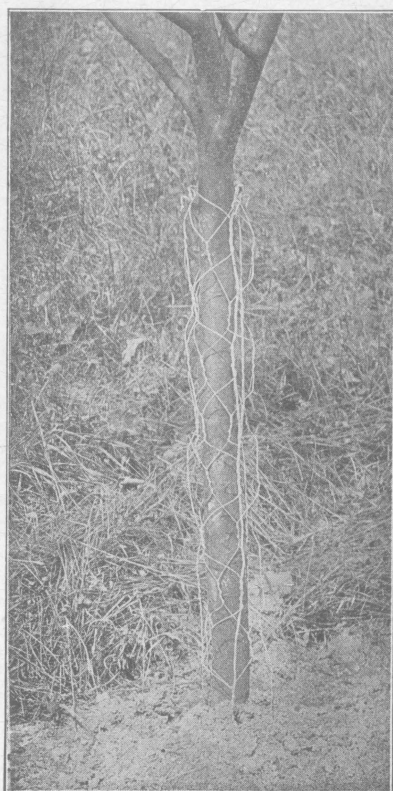


Fig. 10. Standard poultry netting.

in Figs. 8 and 9 in order that there may be at least two rounds of the netting encircling the stem of the tree. Rabbits and woodchucks will not be able seriously to injure a tree thus protected. This form

presents no obstacle to the work of mice; but mounding slightly, in connection, will baffle these little pests. Made from new stock 24 inches wide, purchased by the bale of 150 lineal feet, this style would at present prices, cost \$1.50 per hundred protectors.

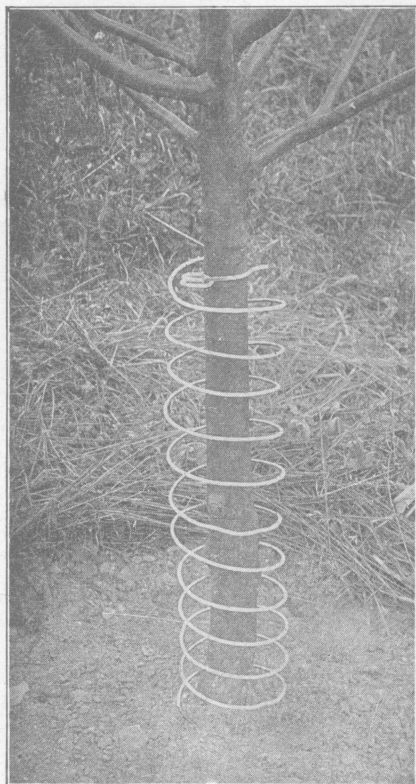


Fig. 11. The spiral coil.

THE SPIRAL WIRE

Spiral protectors of heavy wire have been offered on the market for some years, but there are few used in Ohio. While effective against rabbits, they are of no avail against mice except as the trees are mounded. Hence this form is not superior in any way to the wire netting protectors already described.

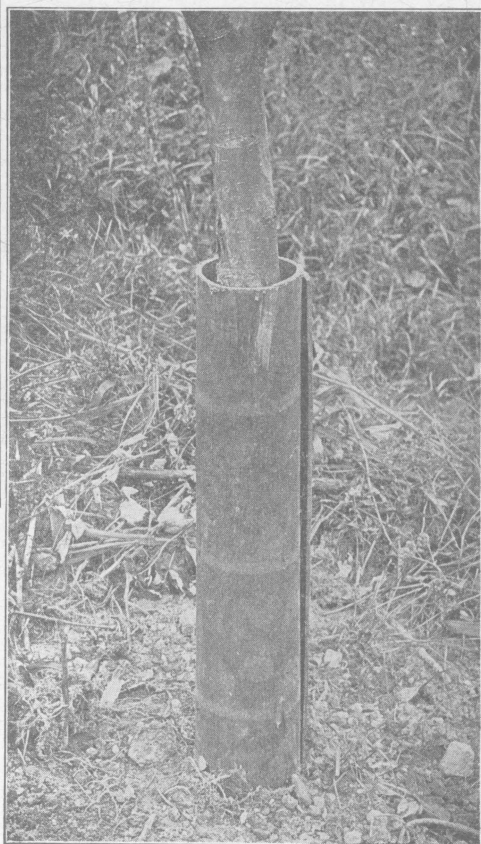


Fig. 12. Wood veneer.

WOOD VENEER

This style is effective against all kind of rodents; but, as they form a tight, close, light-excluding cylinder, various forms of insect life thrive in the crevices and under the cover thus provided. The woolly aphid or root louse, when present in the orchard, increase in great numbers on the bodies of the trees under such covers. While the

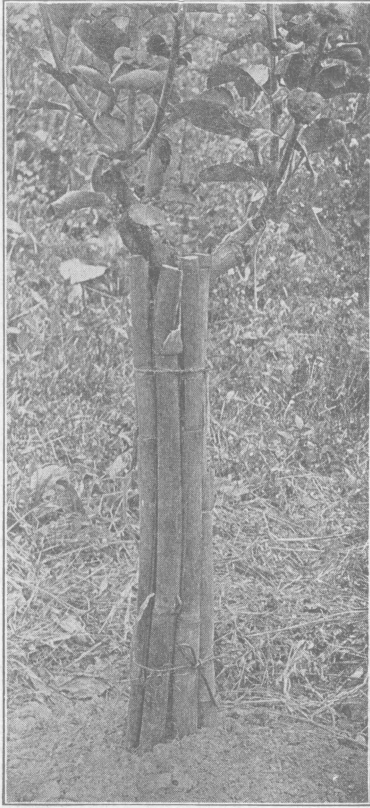


Fig. 13. Corn stalks.

veneers are excellent protectors for the winter season, both from injury by rodents and from winter injury to the stems of the trees, they should be removed during the summer season. The different forms of wire cylinders are preferred.

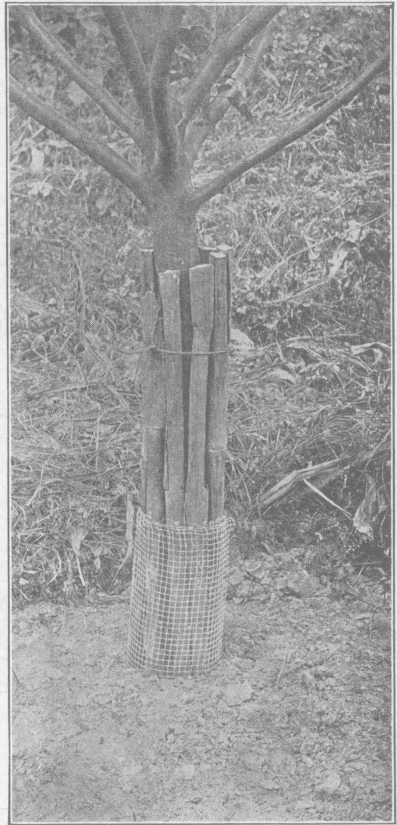


Fig. 14. Wire cloth and corn stalk.

CORN STALKS

There is no device superior in effectiveness against rabbits and groundhogs than this, and certainly none cheaper for the farm orchard. There is practically no cost of material where corn is

grown or cornstalks fed. A good plan is to take the bundles of stover as they come from the field, before feeding to the stock. Lay the bundle on a low platform or broad, low box, and "square-off" the butts with an ordinary "Lightning" hay knife. A solid block and a broad-ax may be made to answer, but the hay knife is much better. Next cut off a two-foot length of the lower ends of the stalks in the same way. These sections may be fed to the stock either in a manger or in the feed-lot, where the blades will be cleanly and neatly stripped off. After a few days' feeding several hundreds or even thousands of these uniform length stalks may be rapidly gathered up and tied in bales for future use. Five or six stalks bound firmly about the stem of a young tree, with twine or short sections of baling or broom wire, as shown in the picture Fig. 13, will constitute a protector that will last not only for one season, but for several or as long, usually, as the tree needs protection from rabbits. The stalks readily yield as the stem of the tree increases in size. In case wire ties are used for binding on the stalks, great care should be exercised to see that these are removed from about the tree when the stalks are taken off. If not removed they will drop down about the collar of the tree and become covered with soil and forgotten. Trees have been killed by wire girdling in this way.

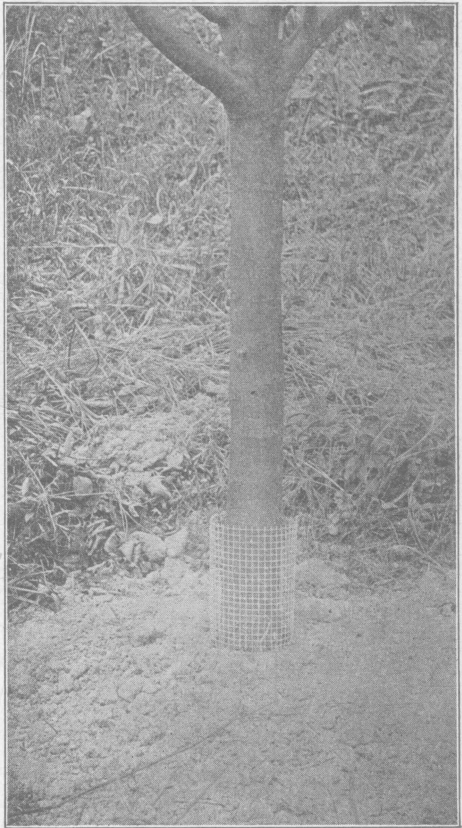


Fig. 15. The short, wire cylinder.

By mounding the bases of the trees slightly with fresh soil and firming it well, a stalk-protected tree is quite secure from all rodent enemies.

COMBINATION WIRE CLOTH AND CORN STALKS

This form will appeal to the most exacting. The stalks protect the stems from rabbits, while the 8-inch wire cloth cylinders, cut from the same material in Fig. 8, completely baffle the mice even in badly infested orchards. The wire cylinders should be forced down two or three inches in the ground. These cylinders are formed from sections of wire cloth 8 x 12 inches in size. Cost, about 1 cent each.

THE SHORT, WIRE CYLINDER

When trees have attained the age of six or seven years they are usually beyond the period of injury by rabbits. We then have to protect only against mice. The short, galvanized wire cloth cylinder alone, well imbedded in the soil about the base of the tree, is quite sufficient even in badly infested orchards, except when unusually deep snows come and lie a considerable time on the ground. It may then be well to tread down the snow immediately about the trees to prevent mice burrowing about and feeding upon the stems above the protectors.

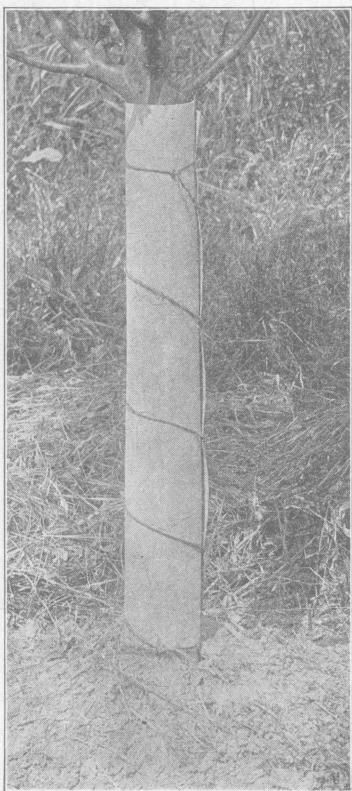


Fig. 16. The simple paper cylinder.

THE SIMPLE PAPER CYLINDER

In combination with the soil or cinder mound, paper wrappers of different kinds are temporarily effective in protecting from rabbits; but these protectors should be removed during the summer season because of the fact that they afford excellent places for concealment of the larvæ of certain insects and for the woolly aphids.

A simple paper cylinder formed of ordinary printing, wrapping or even newspaper, will serve well for a single winter. The picture above shows clearly the manner of applying and tying in place. All paper wrappers should extend a little below the surface of the soil at the base.

BUILDING PAPER

A good grade of building or "sheathing" paper is, of course, preferable to wrapping or newspaper for tree protection. According to grade, these heavier wrappers should cost but from one-tenth to one-fifth of a cent each or 10 to 20 cents per 100, if the paper be purchased by the roll of 500 square feet. These may be put on the trees

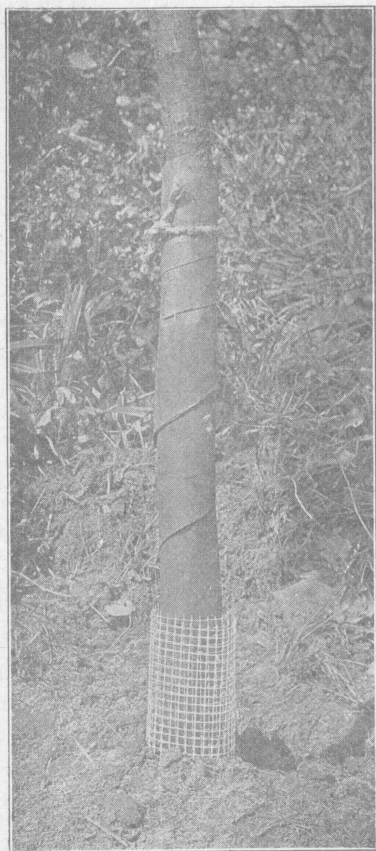


Fig. 18. Combination wire cloth and building paper.

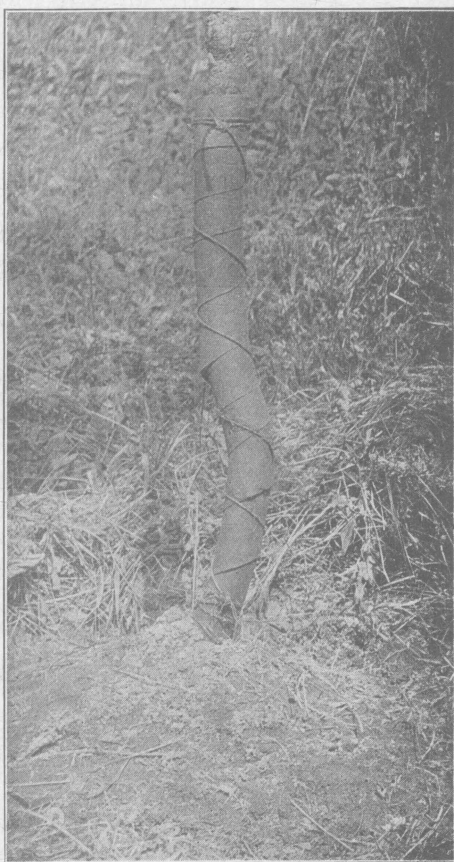


Fig. 17. Building paper.

in the form of a plain cylinder, or the paper may be cut into strips from four to six inches wide and wrapped spirally about the stem to the desired height, beginning at the base and fastened with twine in the usual way.

There are two points of superiority in the plan of spiral wrapping, over the cylindrical protector; first, a crooked bodied tree can be closely and neatly covered (see picture above); second, the

spiral wrapper is more resistant to the strong winds of winter which sometimes play havoc even with building paper protectors if not securely fastened with twine spirally applied.

COMBINATION WIRE CLOTH AND BUILDING PAPER

This protector, put on as shown in the picture, is trustworthy under almost all conditions. The wire screen discourages the mice while the paper wrapper is accepted by the rabbits as an invitation to look elsewhere for forage. The paper may be removed and the screen retained during the growing season.



Fig. 19. A bridge-grafted tree.

ANIMAL BLOOD

Fresh blood from a slaughter house, applied as a paint to the stems of trees in autumn and again in mid-winter, will prevent the work of rabbits. Or, the bodies of the trees may be well rubbed with a piece of fresh pork or beef liver with the same results. These remedies are not effective against mice, however, and should be used in connection with banking or screening the bases of the trees.

Various repulsive and unnamable mixtures have from time

to time been recommended as against the work of rabbits, but the above is just as servicable, and much more cleanly to apply.

AN EFFECTIVE WASH

A thick paint of lime, soap, carbolic acid and sulphur is recommended to protect fruit trees from injury by rabbits, sheep and mice. It is made as follows: Slake one peck of fresh, stone lime

with old soap-suds, thinning to the consistency of whitewash. For the one peck of lime add one-half gallon of crude carbolic acid, four pounds of sulphur and one gallon of soft soap. Paint the trunks of the trees with this in late autumn.

THE MODERN LIME-SULPHUR MIXTURE

It has been found that the lime-sulphur mixture, such as is used for spraying for scale insects, is quite effective in preventing work by rabbits in the orchard and nursery. This is the ordinary 15-15-50 boiled mixture with which nearly all home owners are now familiar. It is used as an autumn spray, the stems of the trees being thoroughly covered with the mixture entirely to the ground.

For those who desire to prepare a small quantity of the lime-sulphur mixture for a few trees, to be used as a paint, the following will be helpful:

Slake one pound of fresh, stone lime in a small quantity of hot water. Or, one pound of ordinary hydrated or "prepared lime may be used instead.

Boil for one hour the one pound of lime with one pound of sulphur in one gallon of water. Thin the boiled mixture with enough hot water to make three and one-third gallons. This should be used while fresh, keeping it well stirred.

CONCLUSION

If young trees be girdled in late spring just as growth is beginning, they may be successfully treated by binding about the wounded parts a heavy covering of smooth tenacious soft clay. A new bark will sometimes

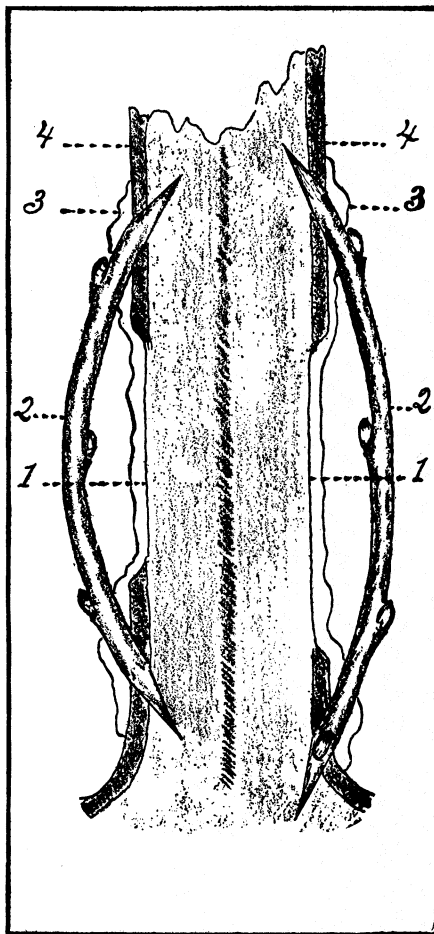


Fig. 20. Bridge-grafting in detail.

- | | |
|-----------|-----------|
| 1. Wound. | 2. Scion. |
| 3. Wax. | 4. Bark. |

form beneath the clay if the inner bark or cambium be not entirely destroyed. It is safer, however, to insert a few long scions as shown in the accompanying picture.

This is called "bridge-grafting." The sap circulation of the tree, cut off by the wound made by the rodents, is resumed through the scions which become a part of the tree—enlarging and growing together until, in after years, only a slight enlargement or "bulge" on the trunk of the tree thus treated will be noticeable.

In bridge-grafting, the wounds should be made clean and smooth with a sharp knife and covered entirely with grafting wax. The scions should be cut a trifle longer than the span to be bridged so that, when they are inserted, their curving form will tend to keep them firmly fixed in position. The two ends of the scions are cut to a thin, wedge form. Incisions are made in the bark with a narrow chisel—those above the wound sloping upward and those below sloping downward. Insert the scions firmly and wax heavily and securely all wounds made in the operation, especial care being exercised to press the wax in firmly and neatly about the points of union of scions with the body of the tree. The sectional drawing will show more clearly than printed description the manner of making the "bridge."

RECEIPT FOR STANDARD GRAFTING WAX

Melt together four parts (by weight) of resin, two parts of beeswax and one part of tallow. Pour the mixture into a pail or tub of cold water. As the mass begins to cool so that it can be handled, grease the hands with tallow and pull and work the lump of wax until it becomes quite light in color. Form into small balls or sticks for convenient use. This wax will keep in good condition indefinitely.